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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/099,875	03/15/2002	Qian Yu	51519-P001US-10203244	5395

29053 7590 10/05/2005

DALLAS OFFICE OF FULBRIGHT & JAWORSKI L.L.P.
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EXAMINER	
LEE, DAVID J	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/099,875	YU ET AL.	
	Examiner	Art Unit	
	David Lee	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10-19* is/are allowed.

6)☒ Claim(s) *1-9 and 20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2002* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-6 are rejected under 35 U.S.C. 102(e) as being anticipated by He et al. (US Patent No. 6,621,067 B2).

Regarding claim 1, He discloses a method of polarization-scrambling an incoming optical signal, comprising the steps of: causing a variation of the SOP as a function of time for an incoming optical signal (col. 7, lines 41-43) that has an unknown SOP to produce a polarization-scrambled optical signal (col. 7, line 41: since the operation of the polarization scrambler is independent of the input SOP, the SOP can be unknown); and periodically changing said SOP of said polarization-scrambled optical signal with time (col. 4, lines 57-60), such that said periodically changing polarization-

scrambled optical signal covers approximately an entire Poincare sphere surface during each time period of said periodic changing (col. 9, line 67 to col. 10, line 3; the signal covers the entire Poincare sphere in a time period).

Regarding claim 2, He discloses that the SOP is distributed substantially uniformly over said entire Poincare sphere during each time period (col. 3, lines 40-41).

Regarding claim 3, He discloses that the method further comprises the steps of propagating the periodically changing polarization-scrambled optical signal through a fiber-optic transmission link (col. 1, line 16) that contains polarization dependent loss (col. 1, line 13, and col. 1, line 43); producing a period variation as a function of time of the optical power of the polarization-scrambled optical signal propagating through the fiber-optic transmission link and measuring the optical signal power variation in real time (col. 10, line 3-6).

Regarding claim 4, He discloses that the real-time measured optical signal power variation consists of peak-to-peak optical signal power variation (col. 10, line 5).

Regarding claim 5, He discloses that the optical signal power variation is measured using a photo-detector (col. 9, line 65).

Regarding claim 6, He discloses that the fiber-optic transmission link contains optical fibers (fig. 5, photo-detector 12 and col. 1, line 16).

3. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Poggiolini (US Patent No. 5,127,066).

Regarding claim 1, Poggiolini teaches a method of polarization-scrambling an incoming optical signal, comprising the steps of: causing a variation of the SOP as a function of time for an incoming optical signal that has an unknown SOP to produce a polarization-scrambled optical signal (col. 3, lines 7-10; the input SOP can be unknown); and periodically changing said SOP of said polarization-scrambled optical signal with time (col. 3, lines 7-10;), such that said periodically changing polarization-scrambled optical signal covers approximately an entire Poincare sphere surface during each time period of said periodic changing (col. 3, lines 24-26; and see also claim 4).

Regarding claim 2, Poggiolini discloses that the SOP is distributed substantially uniformly over said entire Poincare sphere during each time period (col. 8, lines 20-27).

4. Claims 7-9 and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Sluz (Provisional Application 60/230,687).

Regarding claims 7, 9, and 20, Sluz discloses a system for real-time compensation of the performance degrading effect induced by PDL in a multi-wavelength fiber-optic communication system (fig. 2), said system comprising: a first optical polarization controller having an input port operable to receive an input optical signal having a polarization state (the first "Polarization Controls" of fig. 2), said first optical polarization controller being operable to adjust the polarization state of the input optical signal to produce a first intermediate optical signal ("Polarization Controls" is operable to adjust an SOP); a first optical element coupled to the first polarization controller (the fiber connected to the first "Polarization Controls") and operable to

receive and to cause a fixed PDL (an optical fiber produces PDL) in the first intermediate optical signal to produce a second intermediate optical signal; a second optical polarization controller (the second "Polarization Controls") coupled to said first optical element, the second optical polarization controller being operable to adjust the polarization state of the second intermediate optical signal to produce a third intermediate optical signal (the fiber connected to the second "Polarization Controls"); and a second optical element substantially identical to said first optical element, the second optical element being operable to receive and to cause a fixed PDL in the third intermediate optical signal (PDL is a natural limiting factor in fibers) to produce an output optical signal.

Regarding claims 8 and 21, Sluz discloses that the system has an adjustable PDL (PDL varies with environment, and therefore can be considered adjustable).

Regarding claim 22, Sluz discloses that the system comprises a recirculating optical loop ("Feedback Sensor" of fig. 2).

Allowable Subject Matter

5. Claims 10-19 are allowed.

Response to Arguments

6. Applicant's arguments filed on 6/23/2005, with respect to claims 10-16 have been fully considered and are persuasive. The rejection of claims 10-16 has been withdrawn.

7. Applicant's arguments filed on 6/23/2005 with respect to claims 1, 7, and 20 have been fully considered but they are not persuasive.

Regarding claim 1, Applicant argues that He does not teach "periodically changing said SOP of said polarization-scrambled optical signal with time, such that said periodically changing polarization-scrambled optical signal covers approximately an entire Poincare sphere surface during each time period of said periodic changing." However, Examiner disagrees. In column 9, starting from line 67, He discloses that the SOP covers an entire Poincare sphere in a period of time ("in time"). In other words, the SOP of the signal is changed periodically, and in a time period, the signal covers an entire Poincaire sphere. Examiner interprets this to read on the limitations of claim 1.

Regarding claims 7 and 20, Applicant argues that Sluz does not teach that the first or second elements cause a fixed PDL. However, PDL is a limiting factor in optical systems and is produced by fiber links and fiber optic components. Since Sluz discloses the use of fibers to connect the polarization controllers, the fibers are considered the first and second elements which cause the fixed PDL. Another case would be to use amplifiers in between the polarization controllers to boost the signal, and the amplifiers in turn would produce PDL (in which case, the rejection would be a 103 rejection). However, since the limitation of the PDL causing factor is present in the fibers, the Examiner feels this is sufficient enough to read on the claimed limitations.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday, 9:00 am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. R. Sedighian

M. R. SEDIGHIAN
PRIMARY EXAMINER

DL

09-08-00

A PROV

Please type a plus sign (+) inside this box → +

Docket Number: YAFO-014

PROVISIONAL APPLICATION FOR PATENT COVER SHEET (Large Entity)

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

JC714 U.S. PTO 60/230687 09/07/00

INVENTOR(S)/APPLICANT(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Joseph	Sluz	Ellicott City, Maryland

☐ *Additional inventors are being named on page 2 attached hereto*

TITLE OF THE INVENTION (280 characters max)

Independent Feedback Signals for PMD Compensators

CORRESPONDENCE ADDRESS

Direct all correspondence to:

☐ Customer Number → *Place Customer Number Bar Code Label here*

OR

☒ Firm or Individual Name	Stephen R. Whitt				
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Address					
City	Reston	State	VA	ZIP	20194
Country		Telephone	703-433-9208	Fax	703-433-9209

ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 2

☒ Drawing(s) *Number of Sheets* 5 ☐ Other (specify)

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT *(check one)*

☒ A check or money order is enclosed to cover the filing fees

☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 50-0763

FILING FEE AMOUNT: $150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE Stephen R. Whitt DATE September 9, 2000

TYPED or PRINTED NAME Stephen R. Whitt REGISTRATION NO. *(if appropriate)* 34,753

TELEPHONE 703-433-9208

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, DC 20231

P19LARGE/REV04

PROVISIONAL APPLICATION FOR PATENT COVER SHEET (Large Entity)

INVENTOR(S)/APPLICANT(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (city and either State or Foreign Country)

Certificate of Mailing by Express Mail

I certify that this application and enclosed fee is being deposited on with the U.S. Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Samantha E. Buhr

Signature of Person Mailing Correspondence

Samantha E. Buhr

Typed or Printed Name of Person Mailing Correspondence

EL094560576US

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Independent Feedback Signals for PMD Compensators where Number of Signals to be Controlled Exceed the Number of Feedback Signals

A Polar Mode Dispersion Compensator as shown in Figure 1 uses a feedback signal at the output in order to control the variable optical elements to compensate the dispersion. The feedback signal may be derived by electrical (RF) or optical means. However, there are often more signals to control than there are independent feedback signals.

Time Multiplexing

One method to obtain independent feedback is to step each control signal individually while examining the feedback signal. The step is made small enough not to impact system performance, but large enough to be detected under most conditions. After all controls are dithered in this serial manner, the feedback signals provide information for each control signal. This provides significantly more information than a single feedback signal.

Signal/Frequency Multiplexing

Time multiplexing will impact system speed and may not be as accurate as a system that could simultaneously determine an error signal for each control. One method to obtain simultaneous information is to apply a small signal dither signal to the primary control signal. Each control signal is assigned its own characteristic dither signal. This is shown in Figure 2. The C1 control channel is summed with a small dither signal, D1 and the resultant sum T1 is applied to the control device. Similarly, the next control channel is also summed with a second dither signal D2. This is repeated for all the remaining control signals.

The output feedback sensor is then filtered for each specific dither signal. If signal A1 is a sine wave of a specific frequency, the demultiplexer could contain a filtering topology for each sine wave frequency. This results in at least 1 feedback signal for each control signal. Furthermore, the resultant sine wave, such as R1 shown in Figure 2 is essentially the derivative of the control signal.

If the control signal does not have much effect on the data, the dither applied to the main control signal will not have much effect. If the control signal largely effects the feedback signal however, the resultant filtered feedback signal will be very large, as the small dither signal will also have a large effect.

The control signal and dither summation could be accomplished digitally or by analog means. An analog operational amplifier implementation is shown in Figure 3. An offset signal may also be added if needed to ensure the dither signal does not get clipped near the limits of the control device input range. The operation of this figure could also be obtained using a noninverting operational amplifier, as well as combination of operational amplifier functions.

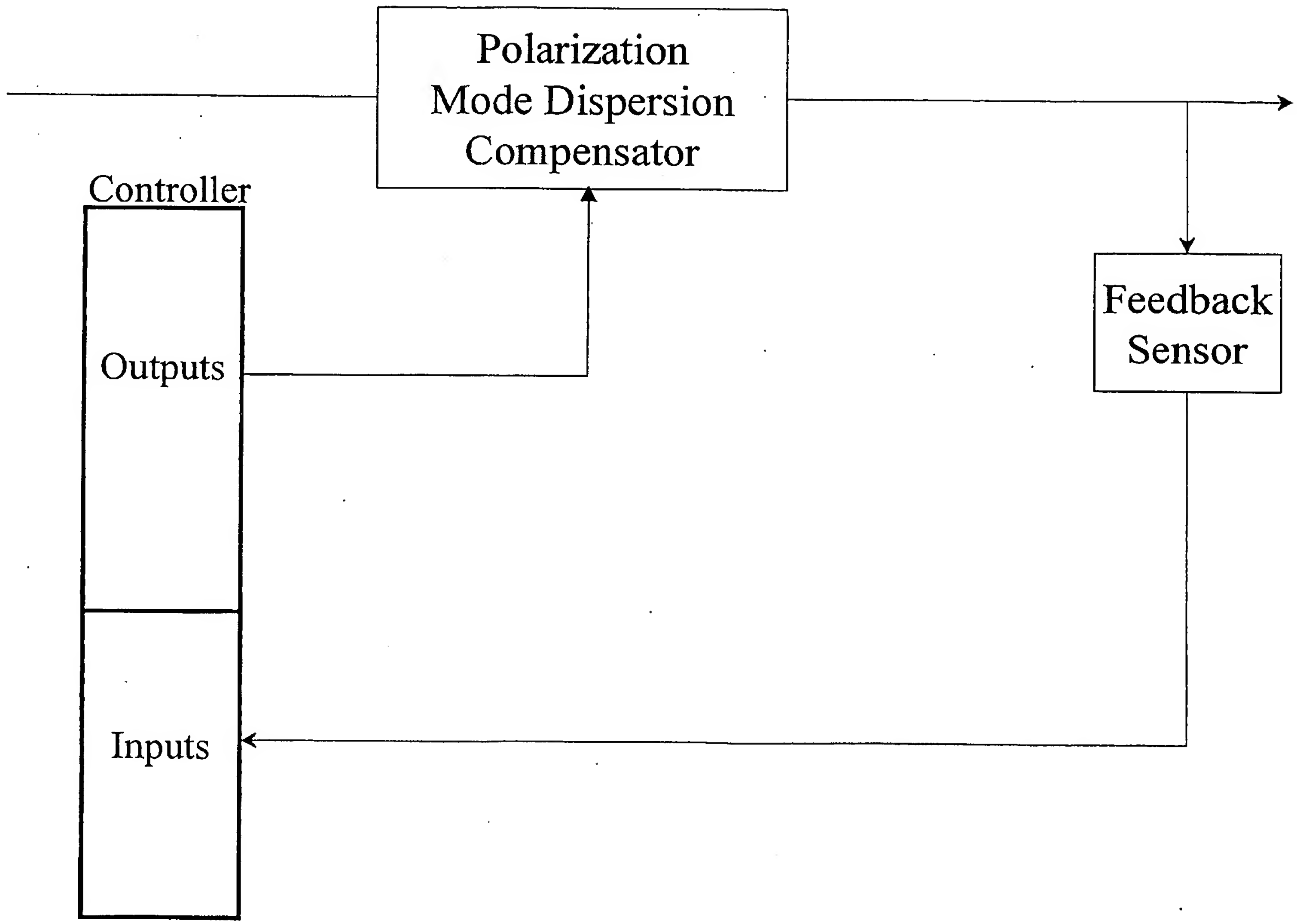
The demultiplexer of Figure 2 can consist of a bank of filters specific to each control signal dither characteristic. This is shown in detail in Figure 4. These filters could be implemented digitally using numeric methods after the input signal is digitized, or by analog means using active or passive filter designs.

The demultiplexer could also be constructed as shown in Figure 5 using synchronous detection techniques. This method uses a sample of the original dither signal source and mixes the source in quadrature with the filtered feedback signal. This provides two significant benefits. The fist is an improvement in detection due to the coherent detection of the signal. This allows a significant advantage under noisy conditions. The second benefit is the complex real/imaginary signal output. Instead of having one signal output per control device there are now two outputs which reveal the sign of the dither derivative. Thus if increasing the primary control signal decreases the feedback signal the direction information from complex detection will reveal this as contrasted if the feedback signal varied in phase with the control signal (increasing feedback signal with increasing control signal).

The circuit is constructed by using a mixer/multiplier that mixes the original signal (appropriately phased with respect to the opposite channel) with the feedback signal. The mixer may be constructed using an

analog mixer device or a switched capacitor topology for analog constructions of this mixer. A low pass filter is then used to get rid of the sum products, followed by an integrator to provide some averaging of the output signal. This circuit could also be realized numerically by mathematically operating on the digitized feedback signal.

FIGURE 1


Polarization
Mode Dispersion
Compensator
Controller
Outputs
Inputs
Feedback
Sensor

09/26,592

FIGURE 2

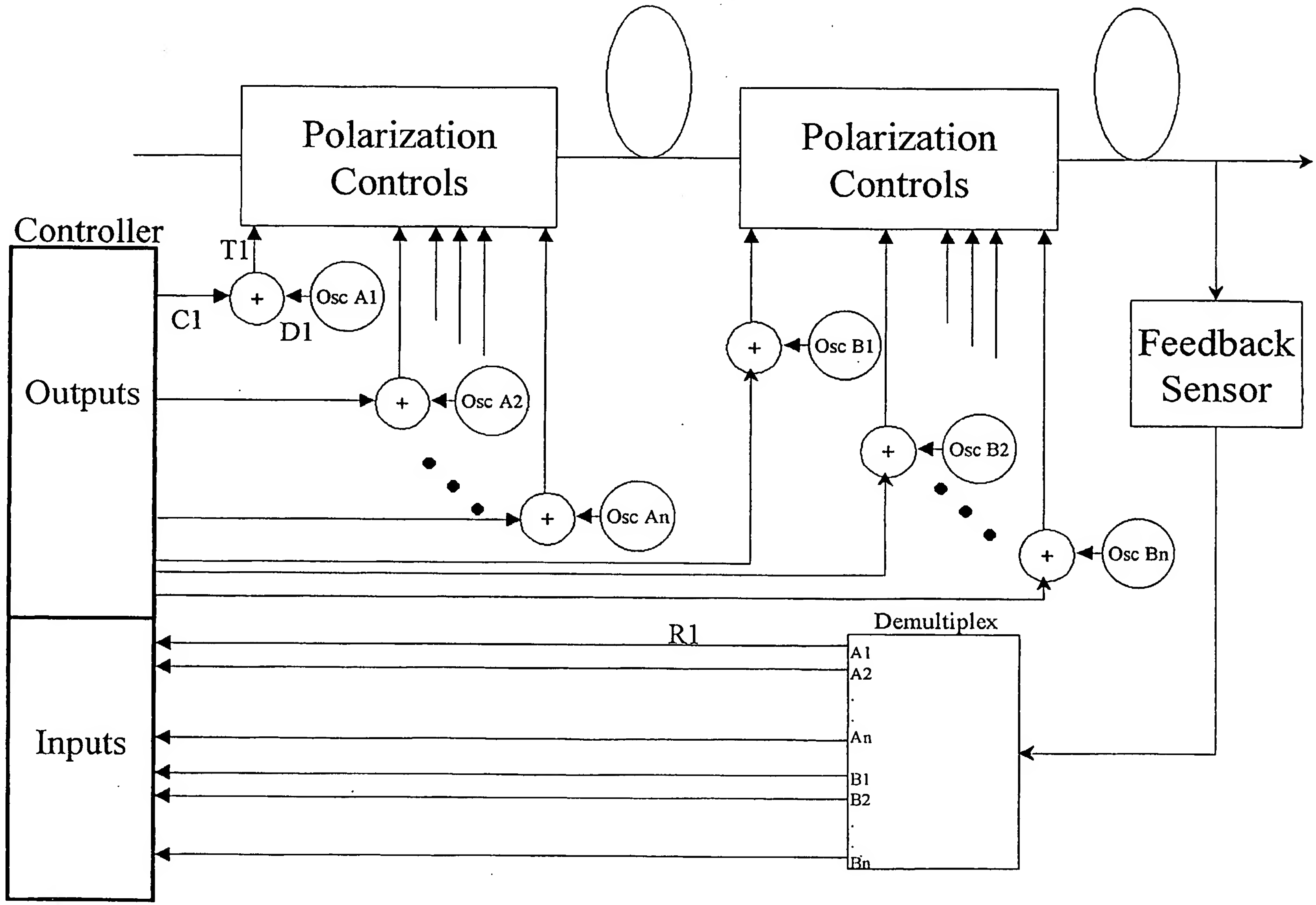


FIGURE 3

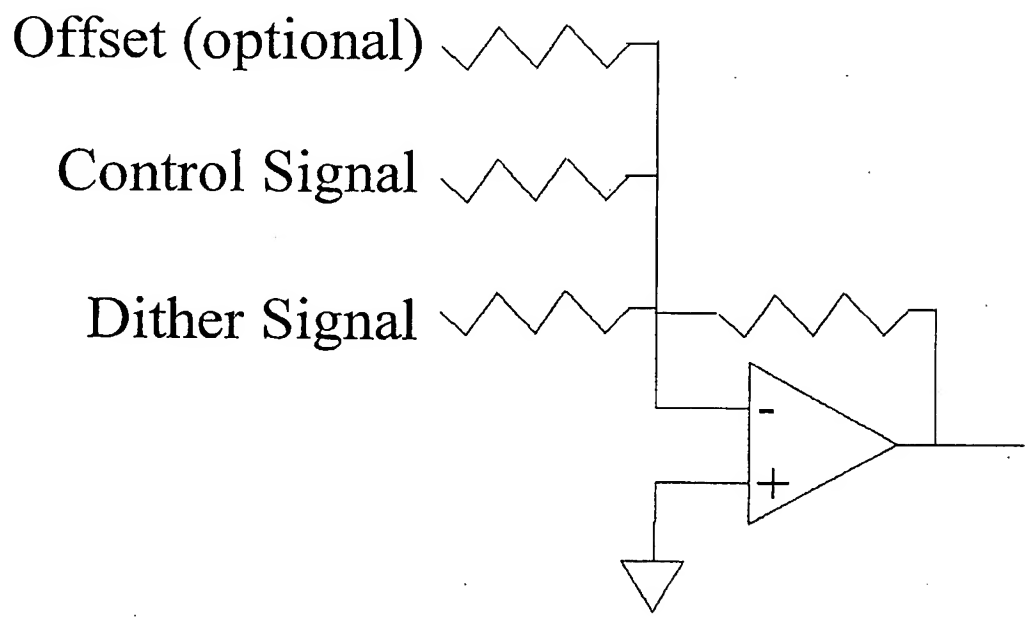


FIGURE 4

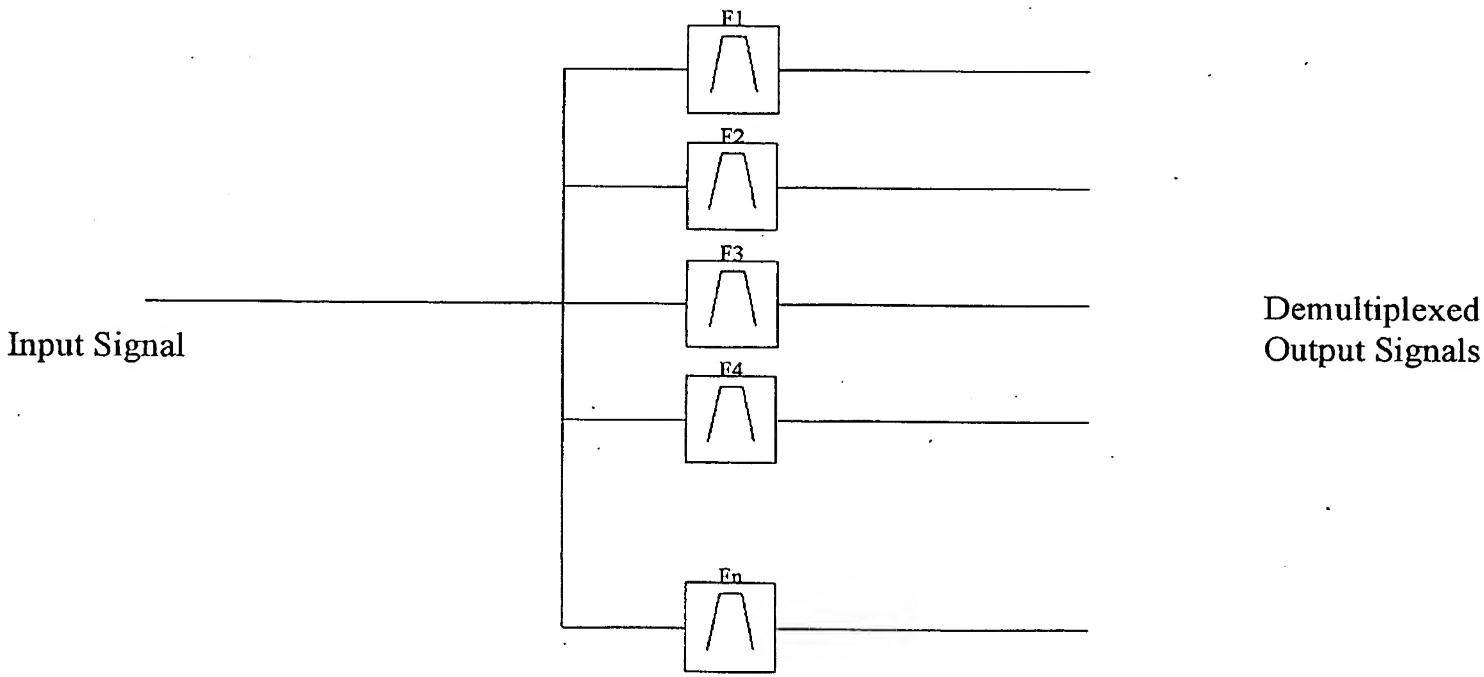


FIGURE 5